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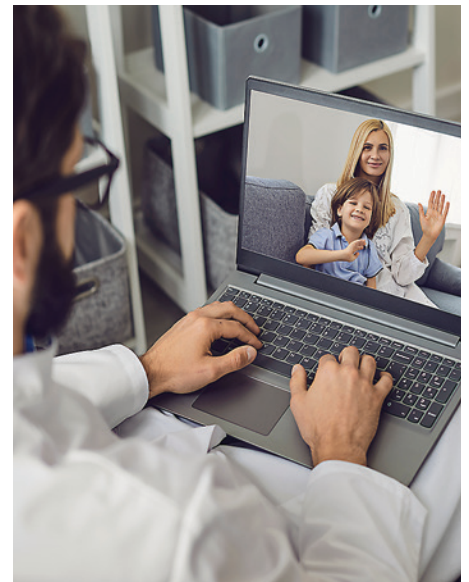
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Telemedicine in the COVID-19 Era: Caring for Pediatric Diabetes Patients at UPMC Children's

Since its emergence as a novel pathogen in late 2019, the coronavirus that causes COVID-19 has exacted an enormous toll by any metric or lens through which one chooses to analyze it. No person, community, country, or continent has been spared. Health care is no exception. COVID-19 has posed monumental challenges to the provision of health care in the United States and around the world.

All health care systems, specialties, and providers in inpatient acute care, outpatient and ambulatory care settings, and long-term care and skilled nursing have been affected. Everyone has been forced to adjust the means and methods of patient care and interactions, ensuring safety for all while remaining connected to their providers.

Individuals with chronic health care needs may be more affected by COVID-19 for many reasons, including being at higher risk for severe complications if they contract the virus, challenges in the management of their underlying condition



presented by COVID-19, and difficulties related to not receiving required timely care and services. Deferred or interrupted care can and does impact one's health.

With winter at hand in 2020, and at the time of this writing, a resurgence in COVID-19 case counts and hospitalizations in the United States, health care systems and providers likely will be tasked yet again to provide care to their patients amid a raging epidemic when safe, in-person visits to the clinic become untenable or unwanted.

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Improving Pediatric Diabetes Management: New Research Investigates School Nurses Perspectives, Roles, and Interactions with Modern Devices

The incidence of type 1 diabetes (T1D) in children continues to increase. Intensive insulin therapy is standard of care, and during the last decade, much progress has been made in developing devices such as insulin pumps, continuous glucose monitors (CGM), and automated hybrid closed-loop systems to effectively administer insulin and monitor glucose levels. However, even with more innovative technologies available to patients and providers, children continue to struggle with and often do not reach glycemic control targets, increasing their risk for short and long-term complications.

How do We Improve Glycemic Control?



For **Christine A. March, MD**, clinical instructor of pediatrics in the Division of Pediatric Endocrinology at UPMC Children's Hospital of Pittsburgh, the question is how we can improve overall

diabetes management in patients with T1D, and who can we effectively partner with in the community to accomplish this?

"In addition to the family, I believe we can strengthen our partnership with schools, and school nurses in particular, as a means to fostering better management in children with T1D. Children spend nearly half of their weekday waking hours at school, and it is a place where they receive consistent care and support. As diabetes management has evolved, we don't know a lot about what circumstances arise for school nurses when it comes to new devices. There is also a lack of consensus or data about how providers can best assist school nurses, students, and families with using modern diabetes devices in the school environment," says Dr. March.

To better understand the experiences and practices of school nurses related to their interactions with new diabetes management devices and technology, Dr. March and colleagues designed a qualitative study

targeting public school nurses across the Commonwealth of Pennsylvania in elementary and middle schools. They interviewed school nurses who have had experience in caring for students with T1D who use some form of device — CGM, insulin pumps, or hybrid closed-loop systems.

This study was designed to understand the current practices, attitudes, challenges, and needs of school nurses in working with children with T1D and their new devices. The study also examined how school nurses interact with the broader health care system on behalf of their students. Dr. March and colleagues' study is the first qualitative approach documenting school nurse perceptions and experiences with the spectrum of modern diabetes devices and related questions.

Four Major Themes Emerged From the Study

• *Training and Experience With New Devices Is Greatly Needed by School Nurses*

School nurses have, are, and expect to interact with children with T1D and the new diabetes devices they use, but there appear to be limited opportunities for school nurses to obtain the necessary training on the latest devices to become comfortable in their interactions.

"There is a perceived and real lack of uniformity in training available to school nurses. With how fast technology changes or advances, this poses significant challenges to school nurses to become adept at working with new devices. This is an area we need to address. If school nurses do not know about the new technologies and how they function, or when changes or new devices become available, they may initially have a harder time in helping their students," says Dr. March.

• *Enthusiasm for New Technology Exists but Is Accompanied by Concerns*

School nurses generally appreciate the ability of new diabetes management devices to help children more effectively control their diabetes with less interruption in their lives.

The devices are viewed by some as time savers when nurse/student interactions are required. They are considered a "safety net" because of their ability to warn about impending glucose issues. However, there can be a struggle with adapting to new changes. CGM in particular provides more information than in the past about glucose trends. Nurses and parents need to have a plan for how to manage the added glucose numbers and alarms without disrupting the child's school day. Nurses also may be unfamiliar with how the device functions and may prefer to rely on trusted methods for glucose monitoring and insulin dosing.



• *Barriers to Integrating Devices in the School*

At both the classroom and institutional level, there are a number of challenges or limiting factors to wider integration of diabetes management technology.

Internet and Wi-Fi connectivity issues exist, and there are often policies in place at the institutional level limiting their use in the classroom.

Continuous glucose monitoring also is controversial in terms of whether or not it should fall into the school nurse's responsibilities because of liability and privacy factors.

"Firm guidelines do not yet exist from clinical organizations or at the state government level on whether CGM should be part of a nurse's personal responsibility. Because of this, tension can develop between parents who frequently feel that nurses should be handling monitoring and the nurses who may not have the capacity to monitor CGM consistently and are wary of liability issues," says Dr. March.

Classroom-specific issues also were identified by study respondents. There is variability in

classroom teacher support because of perceived disruption to the teaching environment if a student has constant CGM alarms or issues. Nurses raised issues related to training or advising teachers unfamiliar with T1D and the technologies used to manage them.

• *Limited or Lack of Collaboration Between Health Care Providers and School Nurses*

In the study, school nurses described a wide variety of interactions with health care systems and what they would characterize as a good or collaborative relationship with health care providers.

"Nurses experience a lot of variability in their relationship with health care providers. There can be communication challenges, and sometimes school nurses want or need more detailed information about their students and more engagement with the treating physicians. Not to mention, school nurses are a wealth of information about the student's diabetes management; they make decisions with that child daily. School nurses want to be seen as part of the child's health care team. Identifying better ways for us to collaborate could be really helpful," says Dr. March.

Key Takeaways and Future Research Directions

For Dr. March, there are several overarching takeaways from this research that her team plans to address moving forward. First, there are opportunities to enhance school-based diabetes care so that families, youth, and school nurses are well-supported. Second, providers and health care systems can better partner with schools to help children with their diabetes management.

These conclusions from the initial study form the basis for the next several steps in her research. In the short term, Dr. March and her team are launching studies in several key areas, including: evaluating CGM metrics to measure glycemic control during the school day and related factors; exploring provider perceptions of their role and ability to counsel patients and families about school-based diabetes care; and comprehensively assessing school nurse confidence and needs with diabetes devices. In the long-term, she plans to engage key stakeholders to build and rigorously test a collaborative care model which brings together various caregivers for children with diabetes — parents, school staff, and health care providers.

"Our team has several immediate projects underway. Our future work in this space will explore important questions and gaps in our knowledge about leveraging diabetes care in the school setting to optimize outcomes," says Dr. March. Dr. March is confident that a school-centered approach would lead to improved glycemic outcomes and psychosocial health for children with diabetes.

Reference

March CA, Nanni M, Kazmerski TM, Siminerio LM, Miller E, Libman IM. Modern Diabetes Devices in the School Setting: Perspectives from School Nurses. *Pediatr Diabetes*. 2020 Aug; 21(5): 832-840.

Telemedicine in the COVID-19 Era *Continued from Page 1*

The Division of Pediatric Endocrinology at UPMC Children's Hospital of Pittsburgh has been a world leader in caring for patients with type 1 and type 2 diabetes. In the 1960s, under the leadership of Allan Drash, MD, UPMC Children's pioneered the concept of team as the diabetes care model, incorporating nurses to educate children and families with diabetes. This clinical care model has evolved further and is the standard of care for children with diabetes worldwide. This spirit of pioneering excellence, ingrained in the fabric of the Division for decades, can be seen in its response to the COVID-19 pandemic.

Telemedicine Takes Center Stage in Health Care

The Division adapted, adjusted, and accelerated wholesale changes in operation to meet the new reality of patient care during an infectious disease pandemic. Their efforts in implementing a telemedicine platform for diabetes patients is highlighted in a new manuscript that is being published in the journal *Endocrinology, Diabetes & Metabolism*.¹



"Before COVID-19, telemedicine for our diabetes patients essentially did not exist. We had little to no infrastructure in place, and we did not have any experience in providing

care to diabetes patients virtually through a telemedicine platform," says **Ingrid Libman, MD, PhD**, associate professor of pediatrics and Director of the Diabetes Program at UPMC Children's. "Like so many institutions, we had to rapidly develop, scale-up telemedicine capabilities, and train our providers, patients, and their families on how to use the technology for managing various aspects of care."

The response by The Division of Pediatric Endocrinology at UPMC Children's to COVID-19 and the lessons learned during implementation are outlined in the forthcoming paper.

"Perhaps most importantly, we realized immediately that a comprehensive team approach would be the only path toward success. Every area of the Division was represented in planning and implementation of our telemedicine services and portal for staff and patients. We were also supported tremendously by our IT infrastructure and support partners," says Dr. Libman.

Not all telemedicine platforms are built and designed equally. There are tradeoffs and a lack of desired features in any system. The key to finding the right system for the Division was to analyze the available options and have back-up solutions for individuals who could not access or use the preferred system for various reasons.

"Telemedicine is likely here to stay because of the pandemic. Regulatory bodies, insurance payers, and providers will need to adapt and continue to evolve the rules, regulations, and technologies around the use of these platforms so they can be leveraged appropriately when needed for patient care. It is interesting to think about diabetes patients in general, where the standard of care has been four visits to the clinic each year for follow-up and testing. Perhaps telemedicine will make it easier for patients and families who need extra support to interact with their providers between these in-person visits or for that occasional visit when the patient cannot be seen in person. It will be interesting to monitor the use of telemedicine vis-à-vis glycemic control and well-being for individuals and entire populations of patients," says Dr. Libman.

As part of the telemedicine visit process, UPMC Children's providers incorporated check-in questions and assessments to evaluate the stresses placed on families by the pandemic. This included stressors related to education, work, and finances, as well as supplies for diabetes management. Financial distress that could manifest itself as food insecurity were probed, and resources or support provided if needed.

"We were very concerned about the effects of the pandemic on the trajectory of our patient's diabetes and other life situations. To the extent that we could screen for these issues, we made sure to incorporate them into our telemedicine visit routine with patients and families," says Dr. Libman.

While continuing patient care in an uninterrupted manner was the driving philosophy behind the Division's work to implement telemedicine services for its diabetes patients rapidly, every effort was made to maintain a robust teaching environment for trainees — fellows, residents, and students.

"We were able to maintain our teaching, and we also were able to ensure that our other team members who are crucial to our diabetes patients — social workers, dietitians, and our team of certified diabetes care and education specialists — were integrated into the workflow and telemedicine appointments with families. We made provisions for follow-up communications through a number of channels depending upon the individual patient's needs," explains Dr. Libman.



"We are encouraged that we were able to maintain contact with our patients and families and provide support during the COVID times. In fact, our no-show rates to diabetes clinic

visits significantly went down with our robust transition to telemedicine," says **Radhika Muzumdar, MD**, professor of pediatrics and chief of the Division of Pediatric Endocrinology.

Drs. Muzumdar and Libman are fully aware of some of the limitations of a televisit compared to face-to-face encounters.

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Division News



Research Update: Liraglutide Reduces BMI When Lifestyle Change Isn't Enough

When lifestyle changes aren't enough, a team of international researchers including UPMC Children's Hospital of Pittsburgh Division of Pediatric Endocrinology faculty member **Silva Arslanian, MD**, who is the Richard L. Day Professor of Pediatrics and

scientific director of the Center for Pediatric Research in Obesity and Metabolism, found a significant BMI reduction in children with obesity after taking liraglutide.

In the recent phase 3 clinical trial¹ conducted over a 56-week treatment period and 26-week follow-up period, patients were randomly assigned placebo or liraglutide injections. A significant BMI reduction of at least 5% was observed in nearly 70% of patients receiving liraglutide.

Results of the study were published in the *New England Journal of Medicine* in May.

This trial was sponsored by Novo Nordisk and conducted at a total of 32 sites in Belgium, Mexico, Russia, Sweden, and the United States. Full details of the trial are available at ClinicalTrials.gov under NCT02918279.

Reference

¹ Kelly AS, Auerbach P, Barrientos-Perez M, Gies I, Hale PM, Marcus C, Mastraandrea LD, Prabhu NP, Arslanian S, for the NN8022-4180 Trial Investigators. A Randomized, Controlled Trial of Liraglutide for Adolescents With Obesity. *N Engl J Med*. 2020; 382: 2117-2128.



New R01 Grant Awarded to Division Researcher H. Henry Dong, PhD

H. Henry Dong, PhD, professor of pediatrics in the Division of Pediatric Endocrinology was recently awarded a National Institutes of Health R01 grant for a new investigation titled "FOXO1 in Gestational Diabetes."

Cystic Fibrosis Foundation Awards Grant to Kara Hughan, MD

Kara S. Hughan, MD, MHSc, assistant professor of pediatrics in the Division of Pediatric Endocrinology and director of the Cystic Fibrosis Endocrinology Program, was awarded a new grant in October from the Cystic Fibrosis Foundation. Dr. Hughan's study is called "Islet Cell Function in Youth With CF With and Without Liver Disease."

UPMC Physician Resources — Pediatric Endocrinology

UPMCPhysicianResources.com provides physicians with clinical and research news, videos, and free online continuing medical education (CME) across a wide range of adult and pediatric subspecialties. Experts from UPMC and our partners present on the latest clinical advances, bench-to-bedside research, and best practices in care delivery.

Current CME Courses



Polycystic Ovary Syndrome

Presented by Kara S. Hughan, MD

Dr. Hughan gives a presentation on identifying the diagnostic criteria for PCOS and the risk factors for cardiometabolic disturbance that women face. Upon completion of this activity, participants should be able to:

- Identify the various diagnostic criteria for PCOS
- Identify specific risk factors that place PCOS women at high risk for cardiometabolic disturbance
- Select the best diagnostic test to document anovulatory bleeding in a young adult female with clinical findings suggestive of PCOS

- Highlight the key investigations of both reproductive and cardiometabolic features of the syndrome
- Discuss management of reproductive, cutaneous and metabolic abnormalities in women with PCOS



Diagnose It

Presented by Nursen Gurtunca, MD, and Pushpa Viswanathan, MD

Diagnose It is an ongoing series of case reports presented by **Nursen Gurtunca, MD**, and **Pushpa A. Viswanathan, MD**. This publication

is designed to educate physicians and allied health care professionals through a discussion of some of the most interesting and complex cases seen within the Division of Endocrinology at UPMC Children's Hospital of Pittsburgh. In this course, participants will learn:

- Thyroid hormone physiology
- Pathogenesis of hypophosphatemic rickets
- Causes of primary ovarian failure
- Diagnosis and management of neonatal diabetes

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“In telemedicine visits with diabetes patients, we lack the ability to conduct comprehensive exams and monitor growth, which are standard during in-person visits so we can assess other patient factors outside of glucose levels and insulin use. It likely will be a challenge to replicate those interactions in a virtual visit, but telemedicine still offers an incredibly valuable service, in particular in these challenging times,” says Dr. Libman.

Unfortunately for the world, it appears that the COVID-19 pandemic will not disappear in short order, as all would hope. It will take a concerted and coordinated effort, the likes of which have rarely been seen, to stem its tide and come to grips with its existence. While

there is nothing positive to say about the coronavirus that causes COVID-19, it has forced the broader health care community to take more rapid and dramatic shifts in the provision of patient care than it has before.

“We realize that telemedicine offers unique access and opportunities to both providers and patients and is here to stay even past this pandemic. Lessons from this experience will allow us to identify barriers, devise potential solutions, and optimize patient care through these platforms for the future,” says Dr. Muzumdar.

With telemedicine or other electronic visit platforms being a safe means of keeping socially distanced and therefore hindering

the spread of the disease, their evolution and integration into the fabric of the health care system will likely become more robust and open new avenues of patient care, disease-state monitoring, and research to ascertain their long-term benefits and costs.

Reference

- ¹ March CA, Flint A, DeArment D, Gilliland A, Kelly K, Rizzitano E, Chrisman A, Muzumdar RH, Libman IM. Pediatric Diabetes Care During the COVID-19 Pandemic: Lessons Learned in Scaling Up Telemedicine Services. *Endocrinol Diabetes & Metab*. In press.



About UPMC Children's Hospital of Pittsburgh

Regionally, nationally, and globally, UPMC Children's Hospital of Pittsburgh is a leader in the treatment of childhood conditions and diseases, a pioneer in the development of new and improved therapies, and a top educator of the next generation of pediatricians and pediatric subspecialists. With generous community support, UPMC Children's Hospital has fulfilled this mission since its founding in 1890. UPMC Children's is recognized consistently for its clinical, research, educational, and advocacy-related accomplishments, including ranking 15th among children's hospitals and schools of medicine in funding for pediatric research provided by the National Institutes of Health (FY2019) and ranking on *U.S. News & World Report's* Honor Roll of America's Best Children's Hospitals (2020–21).